

## **The Energy Sector: A case study on Hydropower. In: Climate Change Impacts, Vulnerability and Adaptation**

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### **Abstract:**

Atmospheric concentrations of greenhouse gases have been increasing rapidly (IPCC 1994). This increase has been attributed mainly to human activities. The composition of the atmosphere has thus changed considerably and will continue to do so in future. Such changes are capable of affecting the surface climate of the earth and can have possible consequences on both natural and man-made resources, thereby threatening both marine and terrestrial ecosystems. Deleterious effects of these consequences will affect the well-being of man through impacts on important sectors such as health, agriculture, transport, industry, and water resources (IPCC 1990; 1995). To these sectors, energy is crucial for their development but energy itself is also vulnerable to the effects of climate change. Negative changes in energy production will therefore seriously affect global industrialization programs as well as national economies considering that global demands for energy have been rising at an annual rate of 2% (IPCC, 1995). Kenya, like most developing countries relies on biomass (mostly woodfuel and charcoal) as the biggest source of energy, contributing about 73% of the total energy requirements. It is used by over 80% of the rural population, mostly for cooking and heating. In addition to biomass, the other two major sources of energy in Kenya are petroleum and electricity. The domestic sector is the largest consumer (59%), followed by industry (15%), transportation (11%), agriculture (10%), and commercial (5%) sectors (Kenya/Canada Energy Advisory Project, 1991). When considered in terms of social-economic development, human settlement infrastructure, as well as manufacturing, electricity is the most important form of energy in Kenya. Currently, it is generated from several sources including hydropower, gas turbines, geothermal power and diesel engines. Of the total amount generated, hydropower contributes over 76%. Hydroelectricity generation depends on availability of water, which in turn depends on the prevailing climate. Fluctuations in rainfall and temperature can affect evapotranspiration rates which in turn can determine the channel flow and power generation rates. In this regard, the hydro-power source of electricity becomes the most vulnerable to climate change effects. This study therefore focuses on hydro-power development in Kenya in relation to the impacts of climate change that are anticipated in future.